Optical position indicat r for fastener attaching machine.

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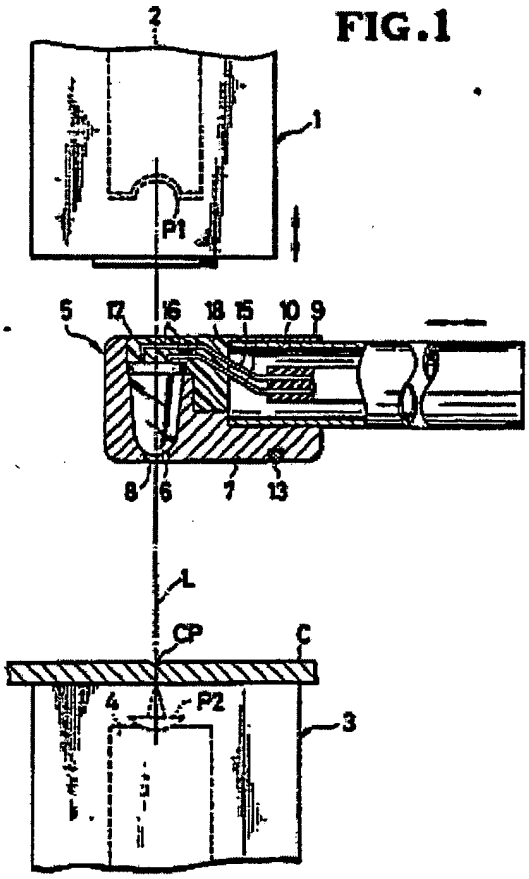
Abstract of **EP0253292**

An optical position indicator (5), disposed between punch and die units (I), (3) of a fastener attaching machine and horizontally reciprocable in timed relation to vertical movement of the punch unit (I), includes a light source (6), and a holder (7) supporting thereon the light source (6) in such a posture that a light beam from the light source (6) is projected directly on the garment fabric (C) without any reflection

FIG.1



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(54) **Optical position indicator for fastener attaching machine.**

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Description

The present invention relates generally to an apparatus for attaching a garment fastener, such as a snap fastener, a button or an ornament, to a garment, and more particularly to such a fastener attaching machine having a device for indicating a correct location in which the garment fastener is to be attached, the correct location being in vertical alignment with a punch and a die of the fastener attaching machine.

A variety of fastener attaching machines are known in which a pair of fastener elements is supported on a lower or die unit and an upper or punch die, respectively; a punch of the upper unit moves toward a die of the lower unit to join the two fastener elements together in clenched condition with a garment fabric sandwiched between the two elements. At that time the garment fabric is correctly positioned between the upper and lower units with the aid of an indicator for designating a correct location on the garment fabric where the fastener is to be attached.

U. S. Pat. No. 4,605,l50, issued Aug. l2, l986, discloses two different optical indicators for the concerned purpose. One of the indicators comprises a horizontal tubular housing having a downwardly opening aperture, a light source disposed at one end of the housing, and a reflector disposed at the other end of the housing for directing a light beam from the light source downwardly through the aperture to project a light spot on the garment fabric. The other indicator comprises a light generating unit, a light reflecting unit, and an optical fiber cable interconnecting the two units. The light reflecting unit includes a horizontal tubular housing having at one end a reflector. The optical fiber cable extends from the light generating unit into the light reflecting unit through the other end thereof for directing a light beam from a light source of the light generating unit to the reflector.

However, because of the reflector, such prior art oplical projectors are complex in construction and hence expensive to manufacture. Another problem with these known projectors is that foreign matter such as dust tends to enter the tubular housing to interrupt the light beam in part, thus causing a fuzzy spot light on the fabric.

The present invention seeks to provide an optical position indicator for fastener attaching machines which is simple in construction and hence inexpensive to manufacture and which can project a distinct and bright light spot on the garment fabric, thus guaranteeing accurate positioning of the garment fabric between the coacting die and punch of the fastener attaching machine.

According to the present invention, there is provided an optical position indicator for a fastener attaching machine to inidcate on a garment fabric a correct location in which a fastener is to be attached to the garment fabric by upper and lower units of said fastener attaching machine, said indicator being horizontally movable into and away from a space between the upper and lower units in timed relation to vertical movements of the upper unit toward and away from the lower unit, said indicator comprising: a light source for generating a light beam; and a holder supporting thereon said light source in such a posture that the light beam from said light source is projected directly on the garment fabric along a common centerline of the upper and lower units, said holder having at an underside of said light source a slit for passage therethrough of the light beam.

Many other objects, advantages and additional features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying drawings in which a preferred structural embodiment incorporating the principle of the present invention is shown by way of illustrative example.

Figure I is a fragmentary side elevational view, partially in cross section, of an optical position indicator embodying the present invention;

Figure 2 is an enlarged plan view, partially in cross section, of the indicator of Figure I; and

Figure 3 is a cross-sectional view taken along line III-III of Figure 2.

Figure I shows an optical position indicator 5 for designating or indicating on a garment fabric C a correct location CP in which a pair of first and second fastener elements PI, P2, such as a button and a tack, is to be attached to the garment fabric C by upper and lower units I, 3 of a fastener attaching machine. As is well known in the art, in attaching the fastener to the garment, the first and second fastener elements PI, P2 are supplied to a punch 2 of the upper unit I and a die 4 of the lower unit 3, respectively, and then the punch 2 is moved toward the die 4 to join the first and second fastener elements PI, P2 together in clenched condition with the garment fabric C sandwiched between the two elements.

The indicator 5 is operatively connected to a suitable drive (not shown) for horizontal reciprocating movements in the directions indicated by a two-headed arrow. Thus the indicator 5 is moved rearwardly (rightwardly) from an advanced position (Figure I) during the downward stroke of the upper unit I, and is moved forwardly (leftwardly) to the advanced position during the upward stroke of the upper unit I.

The indicator 5 generally comprises an elongated tubular support 9, a light source 6, and a holder 7 supporting the light source 6 in a manner described below and connected to one end of the support 9. As it is preferred to produce a condensed ray of light, the light source 6 is a light-emitting diode in the embodiment but may be any other form that produces a condensed ray of light.

The holder 7 supports thereon the light source 6 in such a posture that the light beam from the light source 6 is directed downwardly to the garment fabric C along a common centerline (L) of the punch 2 and the die 4 directly without any reflection. The holder 7 has at the underside of the light source 6 a slit 8 for the passage therethrough of the light beam from the light source 6. The slit 8 serves to assist in

preventing the light beam from being spread and may have a circular, cross-shaped or any other cross-sectional shape.

The holder 7 also has in one end remote from the light source 6 a bore l0 in which one end of the support 9 is inserted. The support 9 is prevented, by means of a generally U-shaped stop spring l3, from being accidentally removed from the holder 7. The stop spring l3, as better shown in Figures 2 and 3, is received in a generally U-shaped peripheral groove l2 of the holder 7 and has a pair of inwardly bent end portions l4, l4 received in a pair of diametrically opposed peripheral slots ll, ll, respectively. Thus support is prevented also from rotating on the holder 7 and can be attached to the latter in a single simple snap action. Alternatively, an adhesive may be used to attach the support 9 to the holder 7.

As shown in Figure l, a pair of terminals l6, l6 of the light source 6 is connected to a pair of lead wires l5, l5 extending through the tubular support 9. In production, after the terminals l6, l6 of the light source 6 are connected to the lead wires l5, l5 by soldering, an insulating resin l8 such as Araldite (tradename) is poured in a recess l7 in the holder 7 not only to prevent any contact between the terminals l6, l6 and between the lead wires l5, l5 but also to keep the light source 6 in place.

In operation, as the upper unit l is in raised position, the indicator 5 is moved forwardly until the light source 6 is aligned with the common centerline L of the punch 2 and the die 4, as shown in Figure l. Since the light source 6 faces downwardly, a light beam generated by the light source 6 is directed through the slit 8 to the garment fabric C along the common centerline L of the punch 2 and the die 4 directly without any reflection. Then, the garment fabric C is shifted to bring the correct point CP (on the fabric C) in register with the light spot projected on the fabric C. Finally, the indicator 5 is retracted from the path of movement of the upper unit l, whereupon the upper unit l is lowered to attach the fastener to the garment fabric C at the correct point CP.

With the optical position indicator 5, since the light source is supported on the holder in such a posture that a light beam from the light sauce is directed to the garment fabric directly without any reflection, the light beam is free from being interrupted by any foreign matter such as dust, thus projecting a distinct and bright light spot on the garment fabric.

Claims

1. An optical position indiactor (5) for a fastener attaching machine to indicate on a garment fabric C a correct location in which a fastener (P1, P2) is to be attached to the garment fabric (C) by upper and lower units (1), (3) of said fastener attaching machine, said indicator (5) being horizontally movable into and away from a space between the upper and lower units (1), (3) in timed r lation to vertical movements of the upper unit (1) toward and away from the lower unit (3), said indicator comprising: a light source (6) for generating a light beam; and a holder (7) supporting thereon said light source (6) in such a posture that the light beam from said light source (6) is projected directly on the garment fabric (C) along a common centerline (L) of the upper and lower units (1), (3), said holder (7) having at an underside of said light source (6) a slit (8) for passage therethrough of the light beam.

2. An optical position indicator according to claim 1, wherein said light source (6) comprises a light-emitting diode.

3. An optical position indicator according to claim 1, further including a tubular support (9) inserted at one end into a bore (10) of said holder (7) and prevented, by a generally U-shaped stop spring (13) from being accidentally removed from said holder (7), said stop spring (13) being received in a generally U-shaped groove (12) in said holder (7) and having a pair of inwardly bent end portions (14), (14) received in a pair of diametrically opposed peripheral slots (11), (11) in said tubular support (9).

Patentansprüche

1. Optischer Lageanzeiger (5) für eine Maschine zum Anbringen von Verschlüssen, um auf einem Kleiderstoff C den richtigen Ort anzuzeigen, wo ein Verschluß (P1, P2) an dem Kleiderstoff (C) durch obere und untere Einheiten (1), (3) der Befestigungsmaschine angebracht werden soll, wobei dieser Anzeiger (5) in zeitlicher Abhängigkeit von den vertikalen Bewegungen der oberen Einheit (1) zu der unteren Einheit (3) hin und von dieser weg in horizontaler Richtung in einen Zwischenraum zwischen der oberen und der unteren Einheit (1), (3) hinein- und aus diesem herausbewegbar ist, wobei der Anzeiger umfaßt: eine Lichtquelle (6) zur Erzeugung eines Lichtstrahls und einen Halter (7) zum Abstützen der Lichtquelle (6) in einer solchen Lage, daß der Lichtstrahl von der Lichtquelle (6) unmittelbar auf den Kleiderstoff (C) längs einer gemeinsamen Mittellinie (L) der oberen und der unteren Einheit (1), (3) projiziert wird, wobei der Halter (7) an einer Unterseite der Lichtquelle (6) einen Schlitz (8) für den Durchtritt des Lichtstrahls hat.

2. Optischer Lageanzeiger nach Anspruch 1, wobei die Lichtquelle (6) eine Leuchtdiode umfaßt.

3. Optischer Lageanzeiger nach Anspruch 1, ferner umfassend einen rohrförmigen Support (9), der an einem Ende in eine Bohrung (10) des Halters (7) eingesetzt und durch eine im allgemeinen U-förmige Haltefeder (13) an einer unbeabsichtigten Trennung von dem Halter (7) gehindert ist, wobei diese Haltefeder (13) in eine im allgemeinen U-förmige Nut (12) des Halters (7) eingreift und zwei nach innen gebogene Endbereiche (14), (14) hat, die in zwei diametral gegenüberliegende Umfangsschlitze (11), (11) des rohrförmigen Supports (9) eingreifen.

Revendications

1. Indicateur de position optique (5) pour une machine de fixation de dispositif de fermeture pour indiquer sur un tissu (C) de vêtement un emplacement correct auquel un dispositif de fermeture (P1, P2) doit être fixé au tissu (C) de vêtement par des uni-

tés supérieure et inférieure (1), (3) de ladite machine de fixation de dispositif de fermeture, ledit indicateur (5) étant mobile horizontalement à l'intérieur d'un espace et de façon à s'éloigner de celui-ci entre les unités supérieure et inférieure (1), (3) en relation synchronisée par rapport aux déplacements verticaux de l'unité supérieure (1) vers l'unité inférieure (3) et en s'éloignant de celle-ci, ledit indicateur comportant: une source lumineuse (6) pour générer un faisceau lumineux; et un dispositif de maintien (7) supportant ladite source (6) dans une position telle que le faisceau lumineux venant de ladite source lumineuse (6) soit directement projeté sur le tissu (C) de vêtement le long d'un axe central commun (L) des unités supérieure et inférieure (1), (3), ledit dispositif de maintien (7) ayant sur une face intérieure de ladite source lumineuse (6) une fente (8) pour le passage à travers celle-ci du faisceau lumineux.

2. Indicateur de position optique selon la revendication 1, dans lequel ladite source lumineuse (6) comporte une diode électro-luminescente.

3. Indicateur de position optique selon la revendication 1, comportant de plus un support tubulaire (9) inséré à une extrémité dans un trou (10) dudit dispositif de maintien (7) et empêché, par un ressort de butée (13) globalement en forme de U, d'être accidentellement retiré dudit dispositif de maintien (7), ledit ressort de butée (13) étant reçu dans une rainure (12) globalement en forme de U dans ledit dispositif de maintien (7) ayant une paire de parties d'extrémité (14), (14) courbée vers l'intérieur reçue dans une paire de fentes périphériques (11) (11) diamétralement opposée dans ledit support tubulaire (9).

FIG.1

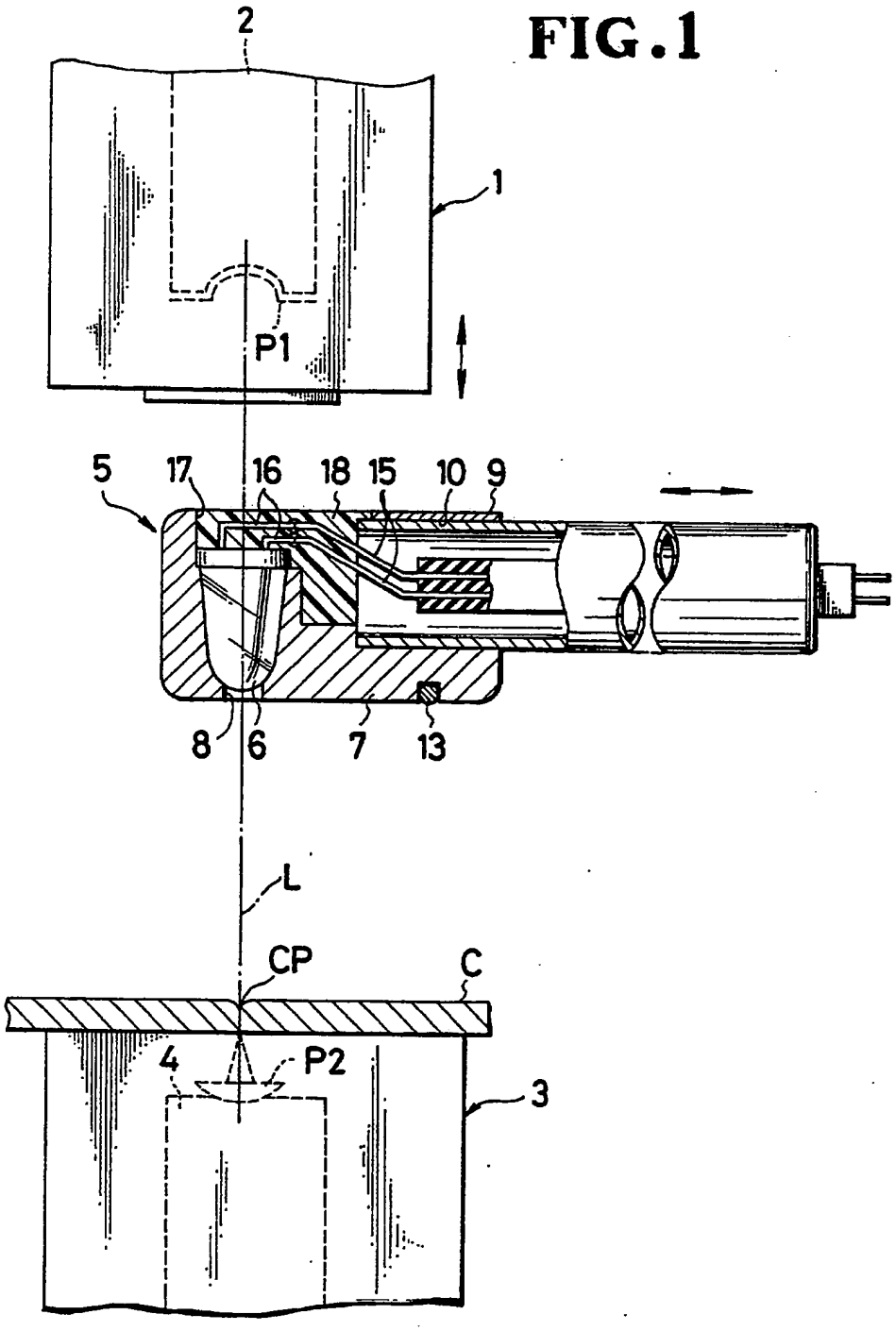

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FIG. 2

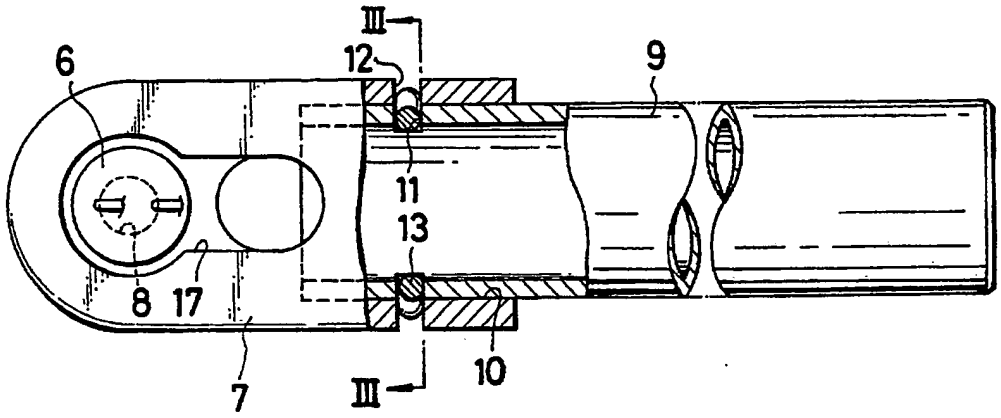

FIG. 3